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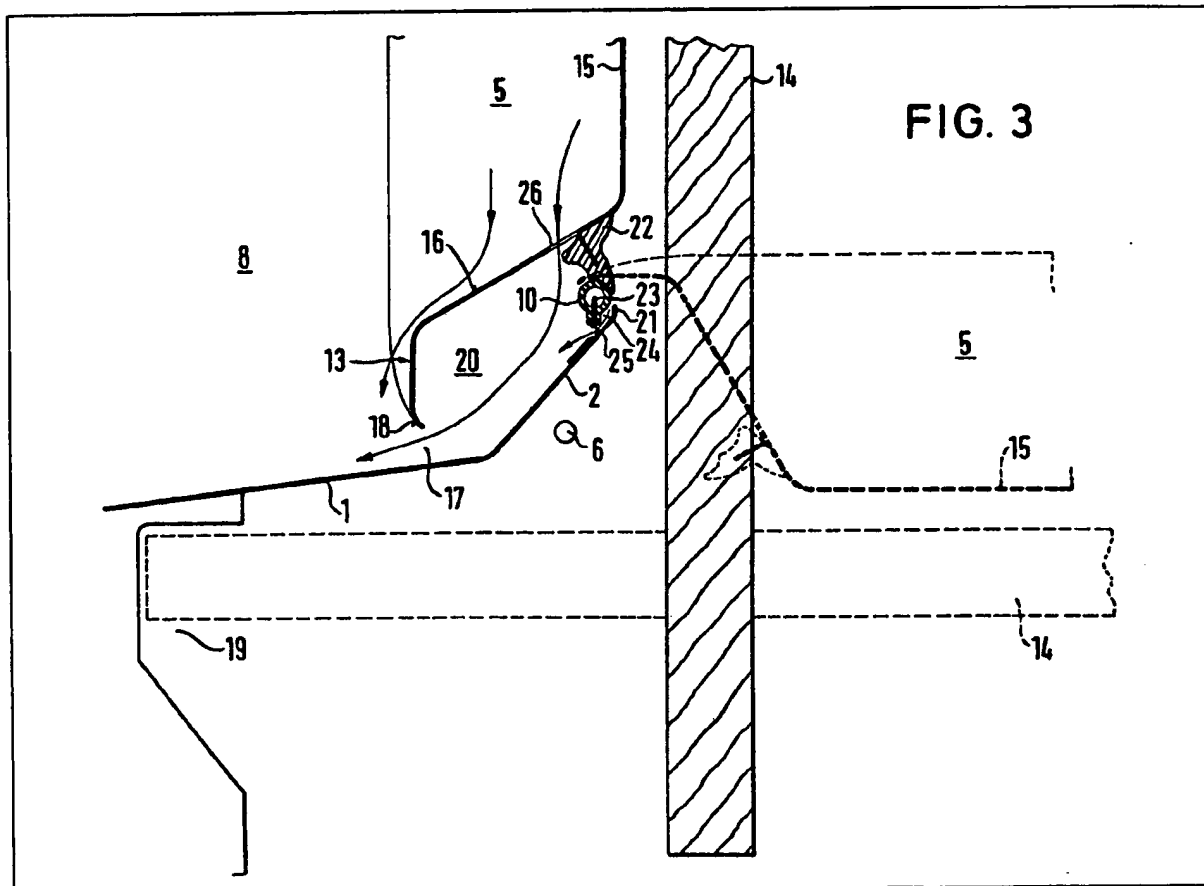
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## (54) Door sealing in a dishwashing machine

(57) A dishwashing machine comprises a rinsing container (8) with a skirt portion (2) bounding the lower edge of a side access opening of the container and a door pivotable about an axis (6) to open and close the access opening, the door comprising an inner door element (5) having a lower portion (16) and a lip portion (13) depending therefrom. For sealing of the door relative to the skirt portion and avoid-

ance of a dirt accumulation at the latter, a sealing strip (22) is provided at the lower portion (16) of the inner door element (5) and a skirt seal (10) at the skirt portion (2), the sealing strip (22) in the closed setting of the door being disposed to sealingly engage the skirt seal (10). In this setting, the lip portion (13) engages over the skirt portion (2) but leaves a gap (17) between the lower rim (18) of the lip portion and the rinsing container base (1), while in the open setting the lip portion covers the skirt seal.



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FIG. 1

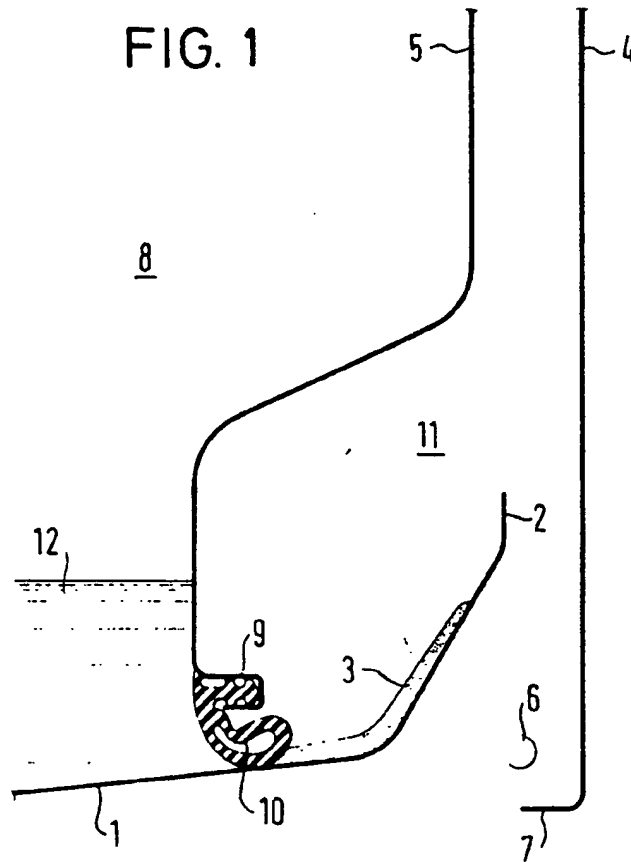


FIG. 2

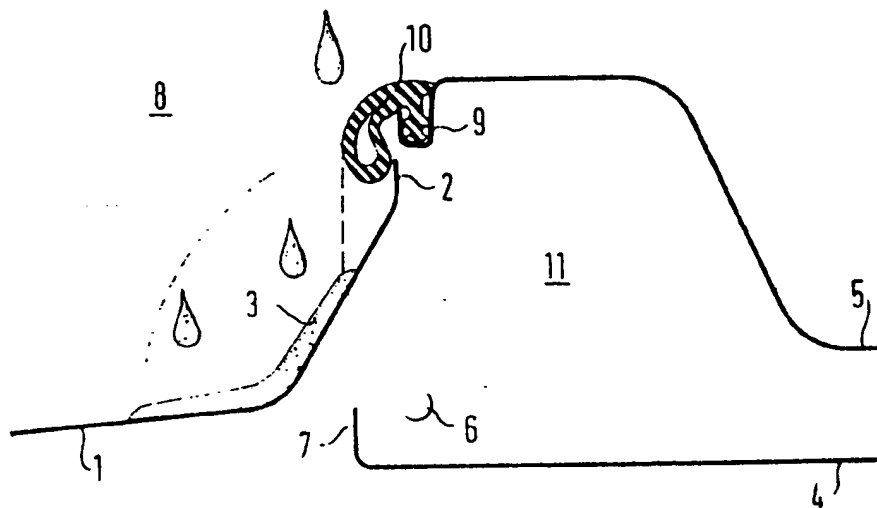
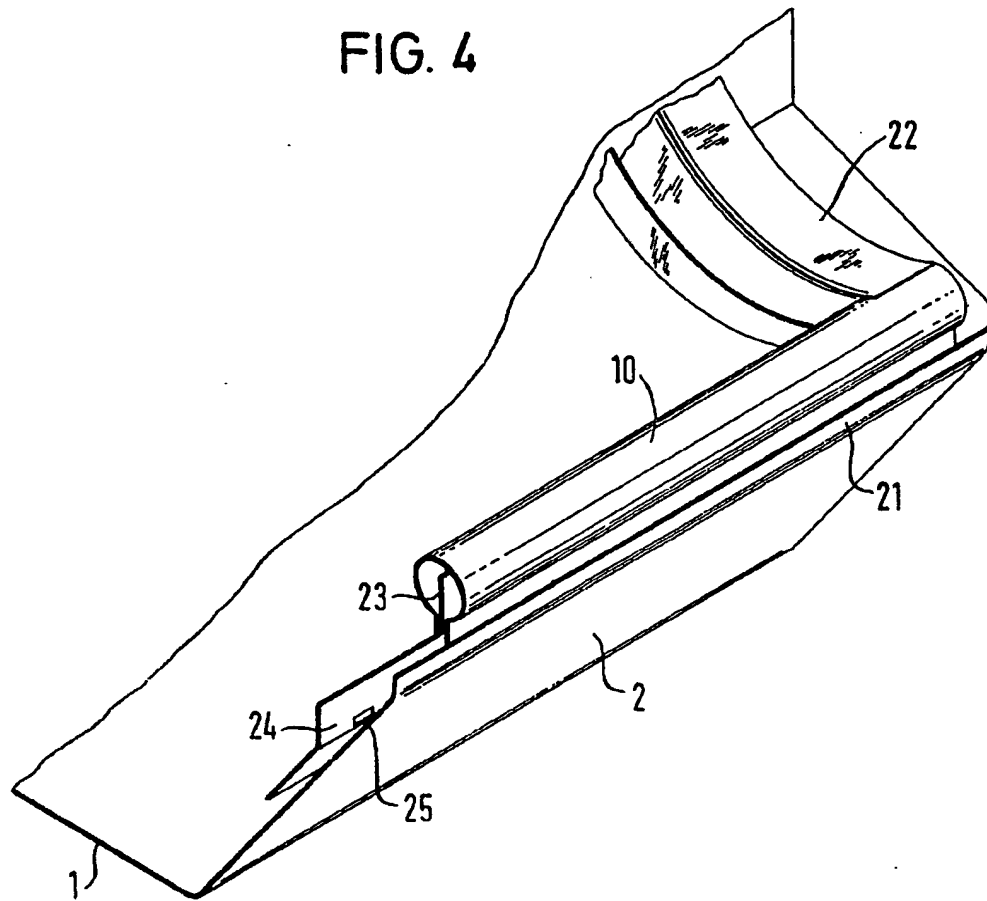




FIG. 4



## SPECIFICATION

### Door sealing in a dishwashing machine

5 The present invention relates to a dishwashing machine and has particular reference to door sealing in such a machine.

In German (Fed. Rep.) Utility Model No. 70 17 821 there is disclosed a dishwashing machine with a front side door, which is double-walled and in which a seal of rubber-elastic material is arranged between a rinsing container of the machine and the inside wall of the door. The strip is approximately U-shaped in cross-section, extends over the entire width of the door and is fastened at one limb to the inside wall of the door and at its other limb to a skirt of the rinsing container, while the portion of the sealing strip between the limbs extends arcuately into the hollow space between the inside wall and the outside wall of the door. In that case, the outside door wall extends down over a pivot axis of the door and this axis is disposed high above the rinsing container base. In this dishwashing machine, which in the absence of a pedestal recess in the machine is not able to be clad with an attachment plate projecting beyond the lower edge of the door, dirt can drip onto the skirt during loading of the crockery baskets, deposit in the upper skirt portion and in the course of time form a dirt zone which, during each loading and unloading of the machine, is fully in the field of view of the operator. Since the machine cannot be clad with furniture attachment doors of kitchen cupboards, an installation, which is adapted in appearance to kitchen furniture, of the machine into a kitchen furniture line is excluded.

40 In another known dishwashing machine (FR-OS 24 97 653), the door is provided with an attachment plate projecting into a pedestal region and mounted to be pivotable about a horizontal axis which extends in the region of the transition of the rinsing container base to the skirt, wherein the vertical plane of the pivot axis lies externally of the rinsing container at a spacing in front of the skirt. An inside element of the door has a lower slightly curved lip provided at its rim with an annular sealing strip which in the closed setting of the door lies against the transition of the rinsing container base to the skirt and in the open setting of the door at the upper skirt rim. It has been found that in the open setting of the door, the skirt portion between the upper rim and the transition to the rinsing container base lies free so that a dirt zone, which cannot be carried away by the rinsing liquid and lies in the field of view of the operator, forms on this skirt portion.

For the cleaning of the dirt zone between the rinsing container skirt and the inside wall of the door of a dishwashing machine, DE-OS 65 30 29 032 provides, in a gap formed be-

tween the skirt and the inside wall of the door and extending over the width of the door, at least one jet spraying the skirt and the door inside wall in the region of the gap as well as a drainage opening from the gap to the rinsing container. This construction is expensive and does not make possible a pedestal recess in the bottom region of the rinsing container as would be required for the pivoting-in of a decorative door plate.

Finally, it has been proposed to provide a dishwashing machine, which has with a pedestal recess starting underneath the base of the rinsing container and a door, which is mounted at the machine body in the region of its bottom side portion above the pedestal recess to be pivotable about a horizontally extending axis and which is clad by an attachment plate projecting into the region of the recess, the pivot axis of the door being disposed at the height of the rinsing container base. The recess is formed directly below the rinsing container base and an attachment plate is arranged to lie at least indirectly against the door (German patent application P 31 04 894.3). A gear, which during the opening of the door constrains a pivotal movement of the attachment plate in advance of and relative to the door, is superfluous and the unit of door and attachment plate consequently simplified. Since the lower rim of the inside door element is constructed to be short, this rim is hardly capable of covering the front side skirt rim of the container base in the open setting of the door so that food remnants falling from the crockery during the charging of the dishwashing machine land in the space between the outside door element and the inside door element. In order to avoid this, the lower rim of the inside door element is provided with a flap which is dragged along during movement of the door and in the open setting of the door covers the gap between this rim and the skirt rim. In spite of the additional effort caused by the drag flap, the dirt zone arising in the skirt region is again disposed in the range of view of the operator.

There is therefore a need for a dishwashing machine in which the build-up of a dirt accumulation as described in the foregoing is avoided or reduced, especially a machine which, through an attachment plate fastenable to the outside of the door, is adaptable in appearance to adjoining kitchen furniture units.

According to the present invention there is provided a dishwashing machine comprising a housing, a rinsing container arranged in the housing and having an access opening at one side of the housing and a skirt portion extending upwardly from the base of the container to the region of the lower edge of the access opening, a sealing element arranged at the skirt portion, a door which is mounted on the housing to be pivotable about a substantially

horizontal axis disposed in front of the skirt portion and in the region of the level of the container base and to be movable between a closed and an open position respectively closing and opening the access opening and which has a lower lip portion arranged to cover the sealing element in the open position of the door and to engage over the skirt portion and leave a gap between the container base and the free end of the lip portion in the closed position of the door, and a sealing strip arranged at a lower portion of the door to sealingly engage the sealing element in the closed position of the door.

It is advantageous in such a machine that an additional part, such as a drag flap or the like, is not needed and that the skirt portion, on which may be deposited food remnants falling from crockery when the door is opened, is constantly cleaned by the rinsing liquid so that a buildup of dirt is prevented or reduced. An accumulation of dirt in the region of the sealing element is avoided through the lip portion covering the sealing element when the door is open. Dirt or food remnants deposited by the rinsing water at the sealing element is or are not visible to the operator because of the covering by the lip portion. When the door is closed, the sealing of the interior space of the rinsing container is ensured through the sealing strip co-operating with the sealing element.

The cleaning of the skirt portion, which can take place through the exchange of liquid between the rinsing container and through the gap between the door lip portion and the rinsing container base up to the sealing location, can be improved if said lower portion of the door has one or more passage openings above the skirt portion and between the sealing strip and the lip portion. In that case, the rinsing water impinging on the inside of the door flows downwardly and passes through the passage openings and into the space between the door lower portion and the skirt portion. This results in a water current which is directed from this space into the rinsing container and cleans the skirt portion particularly effectively of food remnants.

Preferably, the sealing element is mounted on a flange attached to the skirt portion, the flange being arranged to define a collecting pocket with the upper edge portion of the skirt portion and being provided with openings for drainage of the pocket. By this means any leakage water which passes the sealing location between the sealing element and sealing strip can be collected in the pocket and can flow back through the openings into the space above the skirt portion or into the rinsing container.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic sectional view of the mounting region of a known double-walled dishwashing machine door, showing the door in a closed setting;

Figure 2 is a view similar to Fig. 1 but showing the door in an open setting;

Figure 3 is a schematic sectional view of the door mounting region in a dishwashing machine embodying the present invention, wherein the closed setting of the door is shown in solid lines and the open setting in dashed lines; and

Figure 4 is a perspective view of a rinsing container skirt with skirt seal in the machine of Fig. 3.

Referring now to the drawings, for a demonstration of the state of the art, Figs. 1 and 2 show how a dirt zone 3 can form in the region of the transition from the base 1 of a rinsing container in a dishwashing machine (not shown in more detail) to a skirt 2 of the container, which downwardly bounds a front side charging opening of the container. A door for closing the opening consists of an outer element 4 and an inner element 5 and is pivotable about a horizontal axis 6 between a closed setting and an open setting. The axis 6, formed by mounting blocks secured to the housing, is disposed in height in the region of the transition of the base 1 into the skirt 2 and is arranged at a spacing in front of the skirt externally of the rinsing container. The element 4, which is planar in vertical plane, has a lower rim 7 which covers the region of the axis 6, whilst the element 5, which extends inwardly in the lower region into the rinsing container interior space 8, carries a rubber or synthetic material skirt seal 10 at its lower rim 9, while the skirt 2 projects into a downwardly open space 11 between the inner and outer elements 4 and 5.

In the closed position of the door, the seal 10 lies against the base 1 and prevents the transfer of the rinsing liquid 12 behind the sealing location to the skirt 7. Equally, however, the detaching and rinsing away of a dirt zone 3 behind the sealing location is prevented. The build-up of this dirt zone 3 arises, according to Fig. 2, particularly during the charging of the dishwashing machine, as dirt and food remnants can fall into the free-lying skirt 2 when the door is open. During the cleaning and rinsing steps of the dishwashing machine, these dirt deposits cannot be carried away by the rinsing liquid when the door is closed. Since the dirt zone 3 on the skirt is disposed, in the open setting of the door, fully in the field of view of the operator, the cleaning quality of the machine is judged negatively.

In the dishwashing machine embodying the invention as shown in Fig. 3, the inner door element 5—the outer door element is not illustrated—is provided at the end of its lower side portion 16 with an arcuately bent lip 13.

which in the closed setting of the door is disposed above the rinsing container base 1 but leaves a gap 17 between its rim 18 and this base and in the open setting of the door covers the skirt seal 10. Considered in the closed position of the door, the element 5 passes over from an upper vertical, planar door portion 15 into the lower portion 16, extending at an inclination similar to the skirt 2, and then curves to merge with the lip 13.

For the sealing of a skirt space 20 against the skirt upper rim 21, a sealing strip 22 of rubber or, preferably, synthetic material is fastened to the portion 16 and in the closed setting of the door lies tightly against the seal 10. The seal 10 in the illustrated embodiment consists of a rubber hose seal and sits on a web of an angularly shaped metal profile strip 23, which is fastened to the upper part of the skirt 2. The sealing strip 22 has a shape laying itself against the seal 10 and promoting sealing. Any leakage water passing between the sealing strip 22 and the seal 10 is collected in a pocket 24 formed by the profile strip 23 and the rim 21 and passes through openings 25 in the profile strip back into the space 20.

For more intensive cleaning of the skirt 2 to remove dirt deposits, passages 26 are provided in the lower portion 16 of the element 5, which passages conduct the rinsing water flowing down the door portion 15 into the space 20 so that the water flows through this space towards the rinsing container interior space 8 according to the arrows.

When the door is opened, the lip 13 covers the skirt rim 21 and the seal 10 so that these are protected against dirt deposit and screened from the view of the operator. In the travel of the door up to its open setting, the portion 16 with the sealing strip 22 is movable free of contact over the rim 21. The pivot axis 6 of the door in that case lies in a horizontal plane, which extends approximately over the transition of the rinsing container base 1 to the skirt 2, and in a vertical plane which extends externally of the space 20. The attachment plate 14 lies against and is fastened to the outer door element (not shown) and consists of, for example, wood, the plate serving particularly for adaptation of the machine front to the appearance and the pedestal height of any adjoining kitchen cupboards. Designated by 19 is a pedestal recess in the machine body, into which the plate 14 is pivotable when the door is opened.

#### CLAIMS

1. A dishwashing machine comprising a housing, a rinsing container arranged in the housing and having an access opening at one side of the housing and a skirt portion extending upwardly from the base of the container to the region of the lower edge of the access opening, a sealing element arranged at the

skirt portion, a door which is mounted on the housing to be pivotable about a substantially horizontal axis disposed in front of the skirt portion and in the region of the level of the container base and to be movable between a closed and an open position respectively closing and opening the access opening and which has a lower lip portion arranged to cover the sealing element in the open position of the door and to engage over the skirt portion and leave a gap between the container base and the free end of the lip portion in the closed position of the door, and a sealing strip arranged at a lower portion of the door to sealingly engage the sealing element in the closed position of the door.

2. A dishwashing machine as claimed in claim 1, wherein the door comprises an inner door element, an outer door element, and a cover member mounted on the outer door element, the lower lip portion and the sealing strip being provided on the inner door element and the cover member being arranged to project into a recess in the housing below the rinsing container in the open position of the door.

3. A dishwashing machine as claimed in either claim 1 or claim 2, wherein said lower portion of the door is provided with at least one passage opening disposed above the skirt portion in the closed position of the door and between the sealing strip and the lip portion.

4. A dishwashing machine as claimed in any one of the preceding claims, wherein the sealing element is mounted on a flange attached to the skirt portion, the flange being arranged to define a collecting pocket with the upper edge portion of the skirt portion and being provided with openings for drainage of the pocket.

5. A dishwashing machine as claimed in claim 3, wherein the flange is provided by a web of a metallic angle bracket and the sealing element comprises a tube of resilient material.

6. A dishwashing machine as claimed in any one of the preceding claims, wherein the sealing strip comprises resilient material and has a portion sealingly engageable with and, when so engaged, complementary in shape to a portion of the sealing element.

7. A dishwashing machine substantially as hereinbefore described with reference to Figs. 3 and 4 of the accompanying drawings.

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